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IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF CALIFORNIA
SAN JOSE DIVISION

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HYNIX SEMICONDUCTOR INC., HYNIX
SEMICONDUCTOR AMERICA INC.,
HYNIX SEMICONDUCTOR U.K. LTD., and
HYNIX SEMICONDUCTOR
DEUTSCHLAND GmbH,

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Plaintiffs,

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v.

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RAMBUS INC.,

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Defendant.

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No. CV-00-20905 RMW

ORDER GRANTING IN PART AND
DENYING IN PART RAMBUS'S MOTIONS
IN LIMINE NOS. 4 & 5 RELATING TO DR.
CHRISTOPHER McARDLE'S OPINIONS ON
COSTS OF ALTERNATIVE
TECHNOLOGIES AND "LOCK IN" COSTS

[Re Docket Nos. 2651 and 2660]

ORDER GRANTING IN PART AND DENYING IN PART RAMBUS'S MOTIONS *IN LIMINE* NOS. 4 & 5 RELATING TO DR.
CHRISTOPHER McARDLE'S OPINIONS ON COSTS OF ALTERNATIVE TECHNOLOGIES AND "LOCK IN" COSTS
C-00-20905; C-05-00334; C-05-02298; C-06-00244 RMW

TSF

United States District Court

For the Northern District of California

| | | |
|----|------------------------------------|------------------------------------|
| 1 | RAMBUS INC., | No. C-05-00334 RMW |
| 2 | Plaintiff, | [Re Docket No. 564 and 569] |
| 3 | v. | |
| 4 | HYNIX SEMICONDUCTOR INC., HYNIX | |
| 5 | SEMICONDUCTOR AMERICA INC., | |
| 6 | HYNIX SEMICONDUCTOR | |
| 7 | MANUFACTURING AMERICA INC., | |
| 8 | SAMSUNG ELECTRONICS CO., LTD., | |
| 9 | SAMSUNG ELECTRONICS AMERICA, | |
| 10 | INC., SAMSUNG SEMICONDUCTOR, INC., | |
| 11 | SAMSUNG AUSTIN SEMICONDUCTOR, | |
| 12 | L.P., | |
| 13 | RAMBUS INC., | No. C-05-02298 RMW |
| 14 | Plaintiff, | [Re Docket No. 409 and 411] |
| 15 | v. | |
| 16 | SAMSUNG ELECTRONICS CO., LTD., | |
| 17 | SAMSUNG ELECTRONICS AMERICA, | |
| 18 | INC., SAMSUNG SEMICONDUCTOR, INC., | |
| 19 | SAMSUNG AUSTIN SEMICONDUCTOR, | |
| 20 | L.P., | |
| 21 | Defendants. | |
| 22 | NANYA TECHNOLOGY CORPORATION, | |
| 23 | NANYA TECHNOLOGY CORPORATION | |
| 24 | U.S.A., | |
| 25 | Defendants. | |
| 26 | RAMBUS INC., | No. C-06-00244 RMW |
| 27 | Plaintiff, | [Re Docket No. 251 and 256] |
| 28 | v. | |
| 29 | MICRON TECHNOLOGY, INC., and | |
| 30 | MICRON SEMICONDUCTOR PRODUCTS, | |
| 31 | INC. | |
| 32 | Defendants. | |

28 ORDER GRANTING IN PART AND DENYING IN PART RAMBUS'S MOTIONS *IN LIMINE* NOS. 4 & 5 RELATING TO DR. CHRISTOPHER McARDLE'S OPINIONS ON COSTS OF ALTERNATIVE TECHNOLOGIES AND "LOCK IN" COSTS
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1 This order addresses two motions brought by Rambus seeking to exclude the testimony of
2 Dr. Christopher McArdle. Motion *In Limine* No. 4 challenges the reliability of his opinions on the
3 costs of implementing the Manufacturers' proposed alternatives to all of Rambus's technologies at
4 the time that SDRAM and DDR standards were being discussed at JEDEC. The motion also objects
5 to Dr. McArdle's competence to testify as to whether a JEDEC memory engineer would have
6 considered such costs in deciding what standard to adopt. Motion *In Limine* No. 5 seeks to exclude
7 Dr. McArdle's testimony relating to "lock in" costs (costs that would have been incurred by the
8 electronics industry in making an abrupt or gradual change away from the use of Rambus's DRAM
9 technologies following the adoption of the JEDEC standard). The Manufacturers jointly oppose the
10 motions. The court has reviewed the papers and considered the arguments of counsel.

11 For the reasons set forth below, the court denies Motion *In Limine* No. 4 to the extent it seeks
12 to preclude Dr. McArdle's opinion on the cost differences between the disputed Rambus
13 technologies and the suggested alternative approaches and grants the motion insofar as it seeks to
14 exclude Dr. McArdle's opinion on the effect these cost differentials would have had on the decision-
15 makers at JEDEC. The court denies Motion *In Limine* No. 5 to the extent that Dr. McArdle may
16 testify about the "lock-in" phenomenon generally and how the Manufacturers would incur switching
17 costs were they to make a gradual change away from the use of Rambus's technologies in DRAM
18 products. Dr. McArdle may not testify as to his "abrupt change" scenario, nor may he testify to his
19 dollar estimates of "lock-in" damages in the "gradual change" scenario.

I. LEGAL STANDARD

21 Federal Rule of Evidence 702 governs the admissibility of expert testimony. An expert must
22 be qualified by virtue of his or her "knowledge, skill, experience, training, or education." Fed. R.
23 Evid. 702. Experience is often the only basis for reliable expert testimony. *See* Fed. R. Evid. 702,
24 adv. committee note (2000). An expert who relies on experience, however, must "explain how that
25 experience leads to the conclusion reached, why the experience is a sufficient basis for the opinion,
26 and how that experience is reliably applied to the facts." *Id.* The court may not "simply tak[e] the

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1 expert's word for it." *Id.* (internal quotations omitted). To illustrate, the District Court of Alaska
2 recently exercised its discretion and excluded an expert's opinion based upon nothing more than a
3 statement of experience. *Adams v. Teck Cominco Alaska, Inc.*, 399 F. Supp. 2d 1031, 1036-37 (D.
4 Alaska 2005). In that case, an environmental engineer opined that a feasibility study would have
5 cost \$1 million and a site investigation would have cost \$5 million. *Id.* at 1036. The engineer based
6 his estimates on his "professional judgment and experience," but consulted no sources in making his
7 estimates and knew virtually nothing about the case at the time he made his estimates. *Id.* at 1036-
8 37. The court held that this explanation failed to satisfy Rule 702. *Id.* at 1037; *accord Daubert v.*
9 *Merrill Dow Pharmaceuticals, Inc.*, 43 F.3d 1311, 1319 (9th Cir. 1995) ("We've been presented with
10 only the experts' qualifications, their conclusions and their assurances of reliability. Under *Daubert*,
11 that's not enough.").

12 Nevertheless, "[a] review of the caselaw after *Daubert*¹ shows that the rejection of expert
13 testimony is the exception rather than the rule." Fed. R. Evid. 702, adv. committee note (2000). In
14 fact, "[i]n certain fields, experience is the predominant, if not sole, basis for a great deal of expert
15 testimony." *Id.* For example, in *First Tennessee Bank Nat. Ass'n v. Barreto*, the court of appeals
16 upheld the admission of expert testimony that a bank did not act in accordance with prudent banking
17 standards based upon the witness's own practical experiences in the banking industry. 268 F.3d 319,
18 335 (6th Cir. 2001); *see also Hangarter v. Provident Life and Acc. Ins. Co.*, 373 F.3d 998, 1017 fn
19 14 (9th Cir. 2004) (pointing out that cross-examination is an effective way to attack the factual basis
20 for an opinion).

21 Also, reliable testimony must be (1) "based upon sufficient facts or data," (2) "the product of
22 reliable principles and methods," and (3) the witness must reliably apply the principles to the facts.
23 *Id.* "Facts or data" may include other experts' reliable opinions or hypothetical facts that are
24 supported by the evidence. Fed. R. Evid. 702, adv. committee note (2000).

25 As an initial matter, the parties here debate how a court should exercise its "gatekeeper"

27 ¹*Daubert v. Merrell Dow Pharmaceuticals*, 509 U.S. 579 (1993)

1 obligation regarding expert testimony. Rambus emphasizes the "substantial danger" and "quite
2 misleading" nature of improper expert testimony. Mot. 4 at 3 (citing cases). The Manufacturers
3 contend that the court's gatekeeper role is a "limited" one and that "the standard is not that high."
4 Opp. 4 at 4 (citing 4-702 Weinstein's Federal Evidence § 702.05 (2007)). Putting aside the parties'
5 characterizations of the gatekeeper role, the party offering expert testimony must demonstrate by a
6 preponderance of the evidence that its expert's opinions are reliable. *See In re Paoli R.R. Yard PCB*
7 *Litig.*, 35 F.3d 717, 743-44 (3d Cir. 1994). While the court has broad discretion in deciding whether
8 that standard has been met, the court cannot shirk its gatekeeper duties. *See General Elec. Co. v.*
9 *Joiner*, 522 U.S. 136, 142, 146 (1997); compare with *id.* at 148 (Breyer, J., concurring). With these
10 standards in mind, the court addresses the challenged aspects of Dr. McArdle's opinions.

II. ANALYSIS

A. Dr. McArdle's Reports and Qualifications

12 Dr. McArdle has filed three reports. His first report contains his opinion regarding the costs
13 associated with an abrupt disruption of the availability of DRAM technologies. *See* Eskovitz Decl.,
14 Ex. A at 13 (Jan. 13, 2005) (hereinafter "McArdle I"). His second report rebuts a Rambus expert's
15 testimony regarding the costs of implementing various alternatives to Rambus's DRAM technologies
16 before any specific implementation of Rambus's technologies. *See* Eskovitz Decl., Ex. G at 4 (Jul. 7,
17 2006) (hereinafter "McArdle II"). Finally, Dr. McArdle's third report supplements the opinions he
18 gave in his two prior reports. *See* Eskovitz Decl., Ex. L at 4 (Aug. 1, 2007) (hereinafter "McArdle
19 III"). Dr. McArdle has now been deposed four times in connection with this litigation. *See* Eskovitz
20 Decl. at 3-4; Exs. B (deposition transcript, Nov. 17, 2005), E (deposition transcript, Apr. 20, 2006),
21 K (deposition transcript, Jul. 24, 2006), & M (deposition transcript, Sept. 20, 2007).

22 Dr. McArdle has over 25 years of experience in the electronics industry. McArdle I at 5. He
23 holds a Ph.D. in microelectronics and is a fellow of the Institution of Electrical Engineers. *Id.* Over
24 his career, he has been responsible for the design and manufacture of "a wide range of electronic,
25 microelectronic and software products." *Id.*

26 Dr. McArdle has not, however, designed or supervised the design of any DRAM chips.

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1 Eskovitz Decl., Ex. B at 5:6-15. He acknowledged that DRAM design "is a very specialist field that,
2 you know, as I've said, I don't have experience." *Id.* at 149:24-150:8. He clarified that while the
3 "core memory elements of a DRAM" are specialized, the design of an interface to a DRAM is
4 analogous to any other digital logic work. Eskovitz Decl., Ex. K at 173:15-23. Nevertheless, he has
5 not designed an interface for any SDRAM, DDR SDRAM, DDR2 SDRAM, or RDRAM products.
6 *Id.* at 173:24-174:6. He has worked for a number of companies (*see* McArdle I at 5), but has never
7 worked for a DRAM manufacturer. Eskovitz Decl., Ex. B at 144:7-9. He has no JEDEC or DRAM
8 standard setting experience, nor has he ever attended a JEDEC meeting or participated in any
9 DRAM standard-setting activities. *Id.* at 140:20-23, Eskovitz Decl., Ex. K at 51:10-12; Eskovitz
10 Decl. Ex. M at 140:14-23, 156:6-8.

11 **B. Rambus's Objections**

12 **1. Lack of Qualifications**

13 Rambus's primary complaints concerning Dr. McArdle's alternative cost differentials are that
14 Dr. McArdle lacks the requisite qualifications to render such estimates and that the estimates are
15 based upon Dr. McArdle's "own unsupported — and unformed — personal opinions." Mot. at 2:10-
16 11. It is important to recognize that Dr. McArdle is not offering an opinion on the viability of design
17 alternatives but rather merely commenting on the potential difference in the costs of using those
18 alternatives identified by Joe McAlexander and Graham Allen compared to the costs of
19 implementing the Rambus technologies. Therefore, Dr. McArdle's lack of specific DRAM interface
20 design experience does not necessarily mean that he cannot estimate the costs of implementing
21 someone else's design. Dr. McArdle states in his second report that "[he is] able to comment on the
22 likely level of information available to [memory technology engineers] and their likely conclusions
23 as, during the period in question, I specified, designed and managed the design of a wide range of
24 products in semiconductor and other electronic technologies across a wide range of application
25 areas[.]" McArdle II at 8. The court finds that Dr. McArdle by education and experience has
26 sufficient expertise to justify offering his cost differential opinion to the jury.

27 **2. Bases of Cost Opinion**

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1 Dr. McArdle's report discusses a number of factors that influence the cost of implementing
2 the respective technologies. In each instance, Dr. McArdle is responding to the report of a Rambus
3 expert, Michael Geilhufe. After discussing various factors affecting the costs of alternative
4 technologies, Dr. McArdle renders his estimate of the additional cost of implementing each
5 alternative technology identified by McAlexander and Allen over the cost of implementing the
6 corresponding Rambus technology. Rambus correctly points out that some of Dr. McArdle's
7 assumptions are based upon little, if anything, other than his purported personal experience and
8 knowledge. For example, Dr. McArdle in discussing amortization costs states that the industry
9 commonly "re-uses" chip designs, and product life cycles are longer than the one year utilized by
10 Mr. Geilhufe. *Id.* at 9. He does not explain, however, the basis of his opinion that "the cost of the
11 design of the interface circuits could be spread over just 5 devices (5 x 20 million = 100 million)"
12 and, therefore, a "more suitable figure for amortisation [sic]" is in excess of 100 millions units. *Id.*
13 Dr. McArdle's report only justifies spreading the cost of a design over five devices rather than one
14 by the statement that the "approach of 'design re-use' has been followed in the industry for many
15 years and is a major consideration in the design of a modern product." *Id.*

16 Nevertheless, despite some marginally supported statements, the court finds Dr. McArdle has
17 adequately supported his alternative cost differentials. *See id.* at 7-32; McArdle III at 20-23. The
18 court, therefore, in its discretion, finds Dr. McArdle's alternative cost differential opinion
19 sufficiently reliable to allow it into evidence subject, of course, to testing by cross-examination.

20 **C. JEDEC Evaluations of the Cost of Alternative Technologies**

21 Aside from the question of the reliability of Dr. McArdle's opinion of the difference in costs
22 between the Rambus technologies and the Manufacturers' proposed alternatives, Rambus challenges
23 Dr. McArdle's ability to testify to whether a JEDEC memory technology engineer would have
24 considered such costs in deciding which technology to adopt. Dr. McArdle's final conclusion is that
25 "the people at JEDEC making the decision would be unlikely to be convinced of which approach to
26 adopt purely on the basis of cost." McArdle II at 32; McArdle III at 24. Rambus's challenge focuses
27 on Dr. McArdle's qualifications. Rambus emphasizes that Dr. McArdle has never attended a JEDEC

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1 meeting, read JEDEC minutes, or talked to anyone that has attended JEDEC. *See, e.g.*, Eskovitz
2 Decl., Ex. B at 140:20-141:5. Although Dr. McArdle has years of experience in deciding what
3 weight to assign costs in a variety of electronics fields, the court finds that he is not qualified to
4 express an opinion of the effect of costs on JEDEC decisions. First, it seems to the court that costs
5 are inextricably intertwined with effectiveness of the design of the DRAM interface technology and
6 Dr. McArdle does not have that design experience. Second, he has no basis for concluding how a
7 JEDEC decision-maker would weigh the cost factor. Although the Manufacturers can argue that in
8 light of the limited cost differential, a JEDEC member voting on the standard to be adopted would
9 have voted against the adoption of the Rambus technology as the standard, Dr. McArdle has no
10 specialized knowledge on this question. Therefore, although he can testify on the cost differential of
11 the alternatives proposed by Allen and McAlexander, he cannot give his opinion on how a JEDEC
12 member would have voted.

13 **D. Extent of "Lock In"**

14 Rambus challenges each of Dr. McArdle's opinions on the extent of damages allegedly
15 caused by the DRAM industry being "locked in" to using Rambus's technologies. Dr. McArdle has
16 submitted two reports on the subject, which outline an "abrupt change" theory of "lock-in" damages
17 (McArdle I) and a "gradual change" theory of lock-in damages (McArdle III).

18 **1. The "Abrupt Change" Hypothesis**

19 Dr. McArdle's "abrupt change" theory of damages begins with the assumption that
20 "following the dispute between Rambus and Hitachi in 2000, the DRAM technology then
21 predominant in the industry became abruptly unavailable and needed to be quickly replaced by a
22 technology which did not contain any of the features that were the substance of that dispute."
23 McArdle I at 6. From that basis, Dr. McArdle concludes that major DRAM manufacturers
24 (Samsung, Micron, Infineon, Hynix, Nanya and Elpida) would have chosen to adopt a new DRAM
25 technology. *Id.* at 39. These companies, he asserts, would have suffered \$5,538,000,000 in
26 damages from scrapping their inventory and losing sales and \$459,948,000 in new product
27 introduction costs. *Id.* Dr. McArdle also expresses opinions on the costs imposed on other

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1 industrial sectors by an abrupt unavailability of DRAM technology. *See id.* at 40-54.

2 To be admissible, expert testimony must be helpful to a jury in deciding an issue of fact.
3 Fed. R. Evid. 702; *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579, 591 (1993). A
4 reasonable jury cannot credit testimony that fails to reflect reality. *See, e.g., Am. Booksellers Ass'n,*
5 *Inc. v. Barnes & Noble, Inc.*, 135 F. Supp. 2d 1031, 1040-42 (N.D. Cal. 2001) (granting directed
6 verdict on antitrust claim where plaintiffs' expert's testimony "contains entirely too many
7 assumptions and simplifications that are not supported by real-world evidence"). The foundation for
8 Dr. McArdle's "abrupt change" hypothesis and damage estimates are so unmoored from reality as to
9 be unhelpful to a jury. For example, he did little to verify or support design costs, the number and
10 volumes of allegedly affected motherboard companies and retail outlets, training expenses, costs
11 incurred by companies other than Hynix in developing products, and the status of Rambus licensees.
12 He did no economic analysis of the industry during the time period of the "abrupt change." Another
13 example of the lack of reality is his failure to consider that Samsung, the largest DRAM
14 manufacturer at the time, was a Rambus licensee during the period of the assumed abrupt change.
15 Samsung would have had no reason to scrap inventory or develop a new product when it was freely
16 able to continue selling licensed DRAMs. In his deposition, Dr. McArdle conceded that his analysis
17 did not take into account whether any DRAM manufacturers were licensed to use Rambus's
18 technology. *See generally*, Eskovitz Decl., Ex. B at 31:19-37:22. Given that some DRAM
19 manufacturers had licenses to use Rambus's technology, Dr. McArdle also admitted that his scenario
20 and testimony were inconsistent with reality. *Id.* at 36:10-37:13. Because Dr. McArdle's "abrupt
21 change" scenario has no basis in reality, it cannot be presented to the jury.

22 **2. The "Gradual Change" Hypothesis**

23 Dr. McArdle's most recent report builds on his prior work to introduce a theory of how much
24 it would have cost to gradually move away from using Rambus's claimed technology. *See* McArdle
25 III at 3. While suggesting that there are many "non-abrupt change" scenarios, Dr. McArdle in his
26 report describes a situation where a manufacturer would choose to develop an alternative product in
27 parallel with a standardized product to minimize risk. *See id.* at 10-13. Only after being convinced

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1 that consumers would switch to an alternative product, Dr. McArdle hypothesizes, would a
2 manufacturer be willing to stop making the standardized product. *Id.* at 12.²

3 After describing various processes of adopting a new standard, Dr. McArdle estimates the
4 costs of doing so. To provide a "best-case" or lowest cost estimate, Dr. McArdle assumes that the
5 entire industry would adopt a changed interface technology when migrating to the next generation
6 memory device. *Id.* at 14. He then takes his estimate for engineering costs from his first report to
7 suggest a range for the amount the memory industry would have to spend to migrate to an alternative
8 standard. *See id.* at 15. Dr. McArdle also states that switching to a new standard would result in
9 lower initial yields (reflecting the industry's unfamiliarity with making a new product). *Id.* at 15-16.
10 This would result in delays to introducing the product, and delays lead to reduced sales. *Id.* at 16-
11 19. Dr. McArdle then suggests the general magnitude of such costs. *Id.* at 20.

12 Rambus challenges Dr. McArdle's qualifications to offer such opinions, argues that Dr.
13 McArdle did not rely on sufficient facts or data to make his analysis reliable, and that Dr. McArdle's
14 methodology for approximating costs is unreliable. Rambus's arguments regarding the quality of
15 McArdle's data and the accuracy of his methods are meritorious. Dr. McArdle did not adequately
16 testify to the source of his cost data regarding DRAM design despite being asked in multiple
17 depositions. *See* Eskovitz Decl., Ex. B at 58:8-14 & Ex. M at 33:11-36:4. Dr. McArdle's first report
18 suggested that he relied on "interviews and teleconferences with major memory, chipset, tester, IP,
19 software and related organizations." *See* McArdle I at 9. When pressed, however, he conceded that
20 these "interviews and teleconferences" consisted of a total of six conversations, most around thirty
21 minutes long. *See generally* Eskovitz Decl., Ex. E at 50:10-57:18.

22 The Manufacturers are not making damages claims beyond their attorneys' fees.
23 Accordingly, the magnitude of Dr. McArdle's "lock-in" estimates are not of critical importance.
24 While Rambus's objection to how Dr. McArdle constructed his estimates is meritorious, Dr.
25 McArdle does have the expertise to explain in general terms why the Manufacturers were "locked-

26
27 ² Dr. McArdle also suggests a collective radical change where an industry migrates to a
new standard all at once. He considers such a scenario unlikely. McArdle III at 12-13.

1 in" and the type of economic considerations that would come into play in a gradual change to
2 different technology. The court finds that Dr. McArdle's background in engineering and product
3 development does qualify him to testify to his opinion on this subject. *See* McArdle I at 5.

4 **III. ORDER**

5 For the foregoing reasons, the court grants in part and denies in part Rambus's Motions *In*
6 *Limine* Nos. 4 and 5:

- 7 1. Dr. McArdle may testify as to his opinion on the cost differences between the disputed
8 Rambus technologies and the alternative approaches suggested by Allen and McAlexander;
- 9 2. Dr. McArdle is precluded from expressing an opinion on the effect these cost differentials
10 would have had on the decision-makers at JEDEC;
- 11 3. Dr. McArdle may testify about the "lock-in" phenomenon generally and how the
12 Manufacturers would incur switching costs were they to make a gradual change away from the use
13 of Rambus's technologies in DRAM products;
- 14 4. Dr. McArdle may not testify as to his "abrupt change" scenario; and
- 15 5. Dr. McArdle may not express an opinion on the dollar amount of "lock-in" damages in
16 the "gradual change" scenario.

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18 DATED: 1/5/08



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RONALD M. WHYTE
United States District Judge

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21 **Dated:** 1/5/08

22 **TSF**
Chambers of Judge Whyte

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27
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